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ABSTRACT

The centralized warehouse concept as utilized by Montgomery County (Maryland) Public Schools is examined in this report detailing the operation of the warehouse facility and distribution system. After an executive summary, an addendum detailing comments by the staff of the Office of the Associate Superintendent for Supportive Services conflicting with specific recommendations of the report is presented. Chapter 1 focuses on warehousing and warehouse operations with findings on (1) functions of the warehouse, (2) characteristics of the current facility, (3) layout, (4) procedures, (5) housekeeping, (6) material handling equipment, (7) safety, and (8) security. Implications of the findings include current warehouse practices and future warehouse requirements and improvements. Recommendations conclude the chapter. The second chapter focuses on distribution of supplies and materials, with findings on (1) the division of supply and property management, (2) delivery of warehouse supplies, (3) use of helpers on delivery vans, (4) the Pony delivery, (5) distribution of food service supplies, (6) maintenance, and (7) pupil transportation. Implications of the findings include possible consolidations of various supply and food service deliveries. Recommendations conclude the chapter. Included in the report are 19 exhibits (charts, tables, and illustrations). (WTH)

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MONTGOMERY COUNTY
PUBLIC SCHOOLS
ROCKVILLE, MARYLAND

Report on the Warehousing and Distribution Functions of the Division of Supply and Property Management

February 1985

Wilmer S. Cody
Superintendent of Schools

Prepared by the Department of Educational Accountability

EA 019 361

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Report on the Warehousing and Distribution Functions of the Division of Supply and Property Management

by

Dr. William M. Richardson

and

Clifford M. Baacke

February 1985

Division of Administrative Analysis and Audits
Clifford M. Baacke, Director

Department of Educational Accountability
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EXECUTIVE SUMMARY

Montgomery County Public Schools has been using the centralized warehouse concept for the procurement and distribution of supplies for the past 20 years. At least two major factors are important to the cost effective operation of such a concept: (1) the existence and operation of an adequate and efficient warehouse facility and (2) the operation of an efficient distribution system. Each of the chapters of this report examines one of these factors as it operates within MCPS generally and the Division of Supply and Property Management specifically.

Overall, the study found the attitudes of principals towards the services provided by the Division of Supply and Property Management to be very positive. The division has a strong track record for processing a large number of requisitions, distributing a high volume of supplies, and meeting the short-term demands of the school system, although these services are not necessarily carried out at the lowest possible cost or in the most efficient manner. Nevertheless, the "can do" attitude of the division's staff is well respected throughout the school system.

Chapter 1: Warehousing and Warehouse Operations

The Lincoln Center Warehouse serves as the central location for most of the activities of the Division of Supply and Property Management. The primary use of the warehouse is the central receiving, storage, and distribution of school and office supplies. The building also houses the division's administrative offices, the textbook processing and depository function, the property control function, the furniture repair function, forms storage, and other types of general storage.

The five primary tasks performed in the warehouse related to the supplies function are (1) receiving, (2) stocking and inventory, (3) filling requisitions, (4) packing orders for distribution, and (5) loading delivery vehicles.

Current Warehousing Practices

Although the warehouse is not in good physical condition and imposes certain physical constraints on operations, division managers have made efforts to use the space effectively. Among the more satisfactory aspects of warehouse

operations are (a) the general flow of supplies and materials through the warehouse, (b) the orderly condition of the distribution and self storage areas, and (c) materials handling. Additional efforts to improve housekeeping procedures have been started since the study data were collected.

Study data show, however, that the division personnel are overly dependent on "institutional memory" provided by long-term staff, rather than written documentation. The efficiency and effectiveness of the supply warehouse operations could be improved by:

1. Reexamining the overall layout of the warehouse with the minimum objective of considering changes in the layout to improve the space allocated to receiving and packing, widen and mark the aisles, and separate further the receiving and shipping areas

2. Developing written operating procedures and a stock locator system

3. Continuing to improve and documenting current housekeeping practices

4. Enforcing safety requirements for personnel and stored materials

5. Improving security for the warehouse specifically and for Lincoln Center generally

These changes and improvements could be accomplished with a minimum of expense. At the same time, an offsetting modest savings should result from the greater efficencies of better procedures and housekeeping.

Future Warehouse Requirements and Improvements

The current warehouse facility is old, not well suited for continuing use as a warehouse, and not in good physical condition. If MCPS continues operating under a centralized warehouse concept, consideration will have to be given to a replacement warehouse.

The value of the property on which the warehouse is currently located is increasing significantly with the changing surroundings. Although state law would require MCPS to surrender this property to the county government if it were no longer required for school system use, and the county would benefit directly from the increased value, MCPS could benefit indirectly through an agreement with the county regarding the financing of a replacement warehouse.

MCPS currently operates a number of independent warehouse facilities and inventory control systems, including the Food Services Warehouse, the Division of Maintenance Warehouse which is operated by Division of Supply and Property Management, and the primary transportation parts warehouse. Although separate, these warehouses are all part of the Shady Grove Government Services Park in Gaithersburg.

The existence of these separate warehouses and the deteriorating condition of the supply warehouse raise the question of consolidating warehouses to introduce economies. Sanitation requirements, Federal Drug Administration regulations, and other factors restrict the opportunities for consolidation of the supply warehouse with the food services warehouse, although there may be ways to protect the food services operations while taking advantage of the rail siding, energy conservation, and other operating economies. The hygienic factors would not be involved if the consolidation were with the transportation or maintenance warehouse and inventory operations.

On the other hand, it may be that a well-designed, self-contained warehouse and distribution center for the Division of Supply and Property Management would prove to be more cost-effective.

The determination of (1) the cost-effectiveness and advisability of operating a consolidated warehouse; (2) which current warehouse operations, if any, should be consolidated; (3) how the construction and operating costs of a consolidated warehouse would compare to a separate new warehouse for the Division of Supply and Property Management; and (4) whether other units from the Lincoln Center complex should be included in any relocation is not within the scope of this study. However, at the appropriate time, the possible advantages of consolidating staff, sharing floor space, and utilizing common inventory control systems should be explored. With this in mind, MCPS should consider a warehouse relocation and consolidation study to determine the feasibility of various alternatives for replacing the warehouse and other Lincoln Center facilities. This study should be undertaken when either (1) alternative purchasing/distribution systems are considered or (2) it becomes physically necessary to replace the existing supply warehouse. Any new or consolidated warehouse facility which results from the study should be fully automated with a modern inventory control system.

Recommendations

The findings and implications reported in this chapter lead to the following recommendations:

1. The tractor-trailer service area in front of the receiving and shipping docks should be modified to provide additional room to maneuver vehicles. This might be accomplished by moving employee parking closer to North Stonestreet Avenue.

2. A new layout of the floor space allocations should be developed and include the individual suggestions contained in this report. Among these suggestions are (a) increasing the space allocation for the receiving and packing functions, (b) converting some open storage area to pallet rack storage area, (c) increasing the width of and marking the floor for aisles, and (d) further separating the receiving and shipping areas.

3. A more formal, expanded, and documented stock locator system should be designed and implemented.

4. A program to continue increasing the awareness and importance of good housekeeping practices should be developed.

5. Existing standard operating procedures should be documented and issued in writing for confirming orders, receiving functions, picking and packing, and distributing.

6. All types of flammable liquids and other similar materials should be stored in a separate controlled area.

7. The inclusion of the furniture repair area within the warehouse building should be reassessed for safety reasons.

8. A comprehensive security plan which stresses the concept of "reasonable care" should be developed for the warehouse in close consultation with other MCPS units located at the Lincoln Center. The plan should include procedures which limit access to and movement within the warehouse by any persons other than personnel of the Division of Supply and Property Management. One aspect of these procedures should be the establishment of a "secure" area for picking up confirmed orders. Another aspect is securing exterior doors and/or installing gates.

9. Because of the physical condition of the existing warehouse, the lack of a railroad siding, the increased value of the Lincoln Center site, and the increased traffic congestion, consideration should be given to another site for the supply warehouse and possibly for the other functions currently located at the Lincoln Center. Part of that consideration should include a feasibility study and cost-benefit analysis of consolidating the MCPS supply warehouse with other MCPS warehouse operations at the Shady Grove site.

Chapter 2: Distribution of Supplies and Materials

A number of MCPS divisions conduct distribution activities with separate fleets of vehicles. The two major fleets directly concerned with distribution of supplies and materials are the Division of Supply and Property Management and the Division of Food Services. In addition, the Division of Maintenance has a fleet of vehicles which periodically makes trips and distributes supplies and materials to schools and other MCPS facilities. The Division of Transportation, in providing pupil transportation services, makes scheduled daily visits to all schools; however, these visits are not considered in this chapter because their purpose is so distinct from the distribution of supplies and materials. But the Division of Transportation does move parts and supplies among the four bus depots. The focus of the chapter is on the distribution fleets operated by the Division of Supply and Property Management.

Delivery of Warehouse Supplies

Because no written dispatch records are maintained, it was not possible for project staff to determine the frequency of deliveries to individual schools or types of schools, although it is generally agreed that not all schools receive deliveries every day. Nearly half of the principals surveyed indicate that something less than daily supply deliveries would be acceptable without damage to the instructional program. Almost 20 percent of the principals are willing to have deliveries be as infrequent as once a week.

Currently five vans are making supply deliveries each day for a weekly total of 25 runs. If supply deliveries were reduced from five to three days a week (the minimum reduction supported by the largest number of principals) and a staggered delivery schedule begun, only 15 runs would be required each week. At least one delivery van (possibly two, depends upon other distribution needs of the division) could be deleted at this reduced level of service.

Since three deliveries a week would result in supplies reaching the schools within one day of when they do now and since schools could continue the existing practice of sending someone to the warehouse to pick up emergency orders, it appears unlikely that this level of reduced delivery services would have any significant impact on the instructional program.

Use of Helpers on Delivery Vans

The reduction in the number of supply deliveries and the corresponding reduction of at least one delivery van assumes a reduction in the number of delivery helpers by one.

Beyond this reduction is a further possible reduction by eliminating helpers on all delivery vans. On the one hand, the study observed that (a) none of the surrounding school systems which use the centralized warehouse concept find it necessary to provide helpers on supply delivery vans, (b) the MCPS Division of Food Services does not provide helpers on its supply vans although some roughly equivalent weights and delivery situations are involved, (c) building service workers are frequently available to assist with unloading at the schools, and (d) most of the items delivered do not require two persons to carry them.

On the other hand, supply division managers point out (a) the size or weight of some delivered items require a second person to unload, (b) the quantity of items delivered at some locations is such that a helper saves time, and (c) the presence of two persons is a theft deterent. Although other internal control mechanisms, such as signed manifests and delivery slips, can serve as well as a second person to deter theft, the other two points have validity. However, they are not true for every delivery at every school. By grouping large quantity or heavy items on one of the three weekly deliveries to each school and by adjusting routes to balance total delivery loads, the need for supply helpers could be reduced to a single position which would be rotated daily among the five delivery areas.

A reduction of another supply service worker I would save an additional $20,500, including fringe benefits, annually.

During the summer months when school closings and other special factors can increase the volume of large or heavy items being transported on the cargo vans, the current practice of using temporary helpers paid from part-time funds might need to be expanded slightly to offset the position loss. Approximately $5,000 provides 12 weeks of temporary summer help.

Delivery Van Routing

Although division managers indicate that the delivery van routes "are modified on a daily basis to adjust for loading and delivery quantities," the extent of the modifications could not be determined because of the absence of written dispatch records. Information obtained from study interviews is inconsistent on this point. However, since managers indicate that vans are not rerouted across the boundaries of the five predetermined delivery areas, it is clear that at least that self-imposed constraint exists to limit optimal route modifications.

Whether or not the supply delivery service is reduced, obtaining fuel economies and reducing driving times require that maximum effort be given to daily route modifications. If the study suggestions to reduce deliveries and delivery helpers are implemented, careful monitoring and modification of loads and routes become critical.

Possible Fleet Consolidations

Although full feasibility and cost analyses are not within the scope of this study, the following three possible fleet consolidation situations should at least be examined:

1. Pony and Warehouse Supply Deliveries

   Current practice calls for small supply packages to be included on the Pony delivery. Since study observations showed that many warehouse supply packages can be handled by one person, a greater number of supply packages could be added to the Pony runs except for two constraints: (a) the limited interior space and layout of the Pony step vans and (b) the Pony delivery procedures which do not require the driver to contact school personnel or obtain receipt signatures. Therefore, the feasibility and availability of using some larger Pony delivery vehicles or modifying the interior configuration of the existing step vans should be explored, and the added delivery time within schools should be estimated. Then the operating costs and delivery personnel time of an expanded Pony delivery system could be compared to the personnel and operational savings from reducing the supply delivery first.

2. Food Services and Warehouse Supply Deliveries

Food services cargo vans currently make weekly deliveries to all schools from the Food Services Warehouse at Shady Grove, while similar supply management cargo vans make daily (recommended in this report to be reduced to three times each week) deliveries to all schools from the Lincoln Center Warehouse. Hygenic restrictions and the separation of the two warehouse locations have served as constraints against considering any consolidation of these two delivery fleets. Nevertheless, the possibility that operating savings, especially on the longer runs to more distant schools, might result makes the idea of consolidation, at least for non-food items, appealing. If both warehouse supplies and food supplies were issued from the same or adjacent facilities (a possible outcome of the warehouse relocation/consolidation study recommended in Chapter 1), the opportunities for fleet consolidation would increase. Further, if the Pony vans were to carry a greater number of supply packages, as suggested above, consolidation with food services for only the remaining larger/heavier supply items would appear still more feasible and might make possible the virtual elimination of a separate supply delivery fleet.

3. Maintenance and Transportation Depot Deliveries

Transportation and maintenance managers should adopt procedures which assure that neither division would separately move parts and supplies from one depot to another without determining whether the other division had a similar need at roughly the same time.

Food Services Satellite Delivery Vans

Currently, the food services satellite delivery vans are returned to the transportation depots from the central kitchen locations for refueling, security, and overnight maintenance, as necessary. While this is a convenience in the case of refueling and maintenance, other arrangements could be worked out if that would permit an operational savings by eliminating "deadhead" mileage from kitchen to depot and back. However, food services managers point out that there is no current alternate arrangements for truck security since there are no fenced lots at the kitchen locations.

The Division of Transportation has been exploring the feasibility of establishing satellite parking depots for school buses. Each satellite parking lot would be secure and equipped with fuel pumps. If one or more of these satellite lots were located adjacent to a central kitchen, both the Divisions of Transportation and Food Services would benefit. This consideration should be introduced into transportation's feasibility study.

Recommendations

The findings and implications reported in this chapter lead to the following recommendations:

1. The frequency of warehouse supply deliveries to schools and other locations should be reduced. The initial reduction should be from daily to three times a week, with a corresponding reduction in vans, drivers, and helpers. After a year's experience with such a schedule, some further adjustment in frequency may be appropriate.

2. The current practice of assigning delivery helpers (supply services worker I) to supply delivery vans should be changed to provide a helper only on a minimum of one delivery run to each location once a week.

3. The existing practice of using part-time funds during the peak summer months should be expanded as necessary to compensate for the reduction in the number of delivery helper positions.

4. Supply delivery loading and routes should be modified on a daily basis to compensate for scheduled schools which require no delivery that day, to concentrate large items which require a delivery helper, and to adjust for total loading and delivery quantities between cargo vans. Predetermined delivery areas and routes should not be viewed as absolute constraints to the modification procedures.

5. Written dispatch records and manifests should be maintained.

6. MCPS should conduct a study to determine the feasisbility and cost-effectiveness of consolidating some or all of the warehouse supply deliveries with the Pony deliveries and/or the food services deliveries in order to reduce or eliminate one or more of the separate delivery fleets. This study should be closely coordinated with the warehouse relocation/consolidation study recommended in Chapter 1.

7. Managers of the transportation and maintenance divisions should establish the necessary procedures to assure that duplicate delivery runs for parts and supplies are not made between the depots.

8. The Division of Transportation's feasibility study of satellite bus parking lots should be expanded to consider the savings to food services delivery operations if one or more of these satellite lots were located near a central kitchen.

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ADDENDUM

When staff of an organizational unit being studied are not in agreement with the Department of Educational Accountability vis-a-vis findings or recommendations included in a DEA report, the Policy on Educational Accountability provides for staff comments to be included as an addendum to the DEA report.

In accordance with this policy, we provide in this section comments by staff of the Office of the Associate Superintendent for Supportive Services which take issue with some facets of this report.

COMMENTS PROVIDED BY THE OFFICE OF THE
ASSOCIATE SUPERINTENDENT FOR SUPPORTIVE SERVICES

RECOMMENDATIONS, Page E-3

1. The tractor-trailer service area in front of the receiving and shipping docks should be modified to provide additional room to maneuver vehicles. This might be accomplished by moving employee parking closer to North Stonestreet Avenue.

   The maneuvering of vehicles in front of the receiving and shipping docks is not a significant problem. In the summer of 1982, when the observation was made, there were many more summer employees with cars occupying parking space because of the large number of schools being closed.

2. A new layout of the floor space allocations should be developed and include the individual suggestions contained in this report. Among these suggestions are (a) increasing the space allocation for the receiving and packing functions, (b) converting some open storage area to pallet rack storage area, (c) increasing the width of and marking the floor for aisles, and (d) further separating the receiving and shipping areas.

   Movement of materials to meet fluctuating storage needs continues as a standard practice. In the very busy summer months (particularly in 1982), congestion may have appeared to be a problem, but daily moving activity, observation, and supervision continue to be successful.

3. A more formal, expanded, and documented stock locator system should be designed and implemented.

   There is an existing stock locator system in effect that works well. Each item has a catalog number, each storage rack has a number and each bay is identified by an alphabetical letter. These identifications are recorded on shelf label stock numbers for the second or third stock location. Stock location is not a problem.

4. A program to continue increasing the awareness and importance of good housekeeping practices should be developed.

   Supervisors and staff are aware of good housekeeping practices. The debris from receipts and packings are trash canned each day; the building is swept at the end of each day; trash is removed from the building each day; and, staff maintains neat and orderly working spaces.

5. Existing standard operating procedures should be documented and issued in writing for confirming orders, receiving functions, picking and packing, and distributing.

Standard operating procedures will be documented.

6. All types of flammable liquid and other similar materials should be stored in a separate controlled area.

No suitable space is available for the storage of flammable liquids. The fire marshal has been involved in the past with the storage of duplicating fluid in both the schools and warehouse. A capital project proposal for a new warehouse building in the FY 1986 capital budget includes a separate controlled area.

7. The inclusion of the furniture repair area within the warehouse building should be reassessed for safety reasons.

The furniture repair area will be reassessed. The only safety reason cited was flammable liquids, i.e., paint, shellac, varnish, and varsol used in the furniture repair area, used in limited quantitites, and stored in metal cabinets.

8. A comprehensive security plan which stresses the concept of "reasonable care" should be developed for the warehouse in close consultation with other MCPS units located at Lincoln Center. The plan should include procedures which limit access to and movement within the warehouse by any persons other than personnel of the Division of Supply and Property Management. One aspect of these procedures should be the establishment of a "secure" area for picking up confirmed orders. Another aspect is securing exterior doors and/or installing gates.

Security during working hours has not been a problem. MCPS staff visit and are welcome in the distribution center complex. During the summer-fall months of 1982, when MORE observers were periodically in the distribution center, there were between 70-90 people working. It would be very difficult for an observer to identify a non MCPS employee.

In the absence of air conditioning in a major part of the building, doors are opened during business hours to provide ventilation and improve the work environment.

Visitors to the warehouse are "checked in" in the main office before picking up an order. They are then guided by yellow floor arrows to the pick up area. After 3:30 p.m. they are escorted.

The Lincoln Center complex is fenced, and gates are locked at 6:00 p.m. each day except for the gate to the 24 hour security office building. They are reopened at 6:00 a.m. A building services worker tours the buildings each evening to ensure that doors are locked.

"Reasonable care" security is practiced every day in the distribution center complex.

9. Because of the physical condition of the existing warehouse, the lack of a railroad siding, the increased value of the Lincoln Center site, and the increased traffic congestion, consideration should be given to another site for the supply warehouse and possibly for the other functions currently located at Lincoln Center. Part of that consideration should include a feasibility study and cost-benefit analysis of consolidating the MCPS supply warehouse with other MCPS warehouse operations at the Shady Grove site.

An economic feasibility study for the relocation of facilities in the Lincoln Center will be considered as a future capital budget project.

Insofar as consolidation "with other MCPS warehouse operations at the Shady Grove site" there are only two other warehouses. One is the 30,000 square feet of food services warehouse which is fully used. The other warehouse is 5,000 square feet for maintenance supplies which is fully used. Consolidation of these two facilities with the 45,000 square feet of warehouse space in the Lincoln Center is not feasible.

The absence of a railroad siding for the distribution center is not a factor since the majority of deliveries are for bid items which include the price of transportation in the majority of cases, and rail car lots are no longer bid by vendors.

RECOMMENDATIONS, Page E-8

1. The frequency of warehouse supply deliveries to schools and other locations should be reduced. The initial reduction should be from daily to three times a week, with a corresponding reduction in vans, drivers, and helpers. After a year's experience with such a schedule, some further adjustment in frequency may be appropriate.

The frequency of warehouse supply deliveries to 153 schools and other locations should not be reduced. The volume of material handled requires that the inventory be moved daily in and out of the building. The space for assembly of materials to be shipped is not large enough to accumulate supply deliveries without creating congestion and a backup inside the warehouse.

2. The current practice of assigning delivery helpers (supply services worker I) to supply delivery vans should be changed to provide a helper only on a minimum of one delivery run to each location once a week.

The current practice of assigning delivery helpers to delivery vans should continue. The driver and helper both unload and load vans with scores of containers weighing between 50 and 250 pounds. Frequently, the driver and

helper have other assignments to pick up used textbooks, excess furniture, relocate pianos, refrigerators, freezers, ovens, stage risers and platforms. One person cannot reasonably handle these tasks. Implementation of this recommendation would seriously hamper supply services to schools. Staff morale would be seriously impaired. Recent principal association meetings resolved no changes to present supply services. (Commercial carriers have only a driver, but this service is "tailgate delivery" which may end up on the sidewalk.)

3. The existing practice of using part-time funds during the peak summer months should be expanded as necessary to compensate for the reduction in the number of delivery helper positions.

   The existing practice for using part-time funds should be continued to meet the needs of closing and opening schools as well as moving into and out of renovated school buildings.

4. Supply delivery loading and routes should be modified on a daily basis to compensate for scheduled schools which require no delivery that day, to concentrate large items which require a delivery helper, and to adjust for total loading and delivery quantities between cargo vans. Predetermined delivery areas and routes should not be viewed as absolute constraints to the modification procedures.

   This concept of loading and routing is how the supervisor now performs his daily job.

5. Written dispatch records and manifests should be maintained.

   There is and has been a daily dispatch log.

6. MCPS should conduct a study to determine the feasibility and cost-effectiveness of consolidating some or all of the warehouse supply deliveries with the Pony deliveries and/or the food services deliveries in order to reduce or eliminate one or more of the separate delivery fleets. This study should be closely coordinated with the warehouse location/consolidation study recommended in Chapter 1.

   Warehouse deliveries have been made by pony trucks for years depending upon the size of the parcel. Supply deliveries are made daily by pony trucks. The primary purpose of pony mail service is to distribute mail, training film (800-1000 per day), instructional materials, and pay checks.

   Insofar as food services deliveries are concerned, sanitation requirements and FDA regulations preclude comingling school and custodial supplies, particularly in regfrgierated trucks.

   An automated inventory control and distribution system provides an effective control in the distribution of food products. Similarly, the current warehouse supply system is renouned for its responsiveness to schools and offices. Both delivery fleets are required, and are

performing their respective missions in MCPS efficiently. Further studies do not appear warranted.

7. Managers of the transportation and maintenance division should establish the necessary procedures to assure that duplicate delivery runs for parts and supplies are not made between the depots.

   A procedure will be developed with transportation and maintenance division managers to ensure closer coordination and improvements of joint services, and to avoid duplicate deliveries to depots.

8. The Division of Transportation's feasibility study of satellite bus parking lots should be expanded to consider the savings to food services delivery operations if one or more of these satellite lots were located near a central kitchen.

   Space for food service vehicles in satellite bus lots near central kitchens will be considered.

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THE WAREHOUSING AND DISTRIBUTION FUNCTIONS

OF

THE DIVISION OF SUPPLY AND PROPERTY MANAGEMENT

INTRODUCTION

Montgomery County Public Schools has been using the centralized warehouse concept for the procurement and distribution of supplies for the past 20 years. At least two major factors are important to the cost effective operation of such a concept: (1) the existence and operation of an adequate and efficient warehouse facility and (2) the operation of an efficient distribution system.

Chapter 1 examines the first of these two factors. The primary purpose of this chapter is to review the use, operation, and condition of the Division of Supply and Property Management Warehouse. The specific objectives are to (1) identify and review the present functions performed in the warehouse; (2) review its current physical condition; and (3) evaluate its operational characteristics, such as layout, materials flow, and security.

Chapter 2 provides an overview of the various distribution systems currently in use by MCPS and looks specifically at the distribution systems of the Division of Supply and Property Management.

The report does not address the operation of the warehouse facilities or delivery systems managed by the Divisions of Transportation, Maintenance, and Food Services except where these operations are related to a supply and property management warehouse or distribution issue. Some other aspects of the transportation, maintenance, and food services warehouse, inventory, and distribution systems were reviewed in previous management studies of those units. However, it is important to note that several significant changes have been made in these other operations since the original management studies, and some reexamination would be necessary in connection with several of the recommendations in this report. The most significant changes have occurred in food services and maintenance operations.

The information in this report was obtained from (1) interviews with management staff of the Division of Supply and Property Management; (2) a survey of employees in the Division of Supply and Property Management; (3) a survey of half of the MCPS school principals; (4) interviews with the management staff of two Virginia school districts--Arlington and Fairfax Counties, five Maryland school districts--Anne Arundel, Baltimore County, Baltimore City, Howard, and Prince George's, and the District of Columbia Public Schools; and (5) project

staff observations[1] of both the MCPS Lincoln Center Warehouse and those of the City of Baltimore and District of Columbia Public Schools.

Overall, the study found the attitudes of principals towards the services provided by the Division of Supply and Property Management to be very positive. The division has a strong track record for processing a large number of requisitions, distributing a high volume of supplies, and meeting the short-term demands of the school system, although these services are not necessarily carried out at the lowest possible cost or in the mos effecient manner.. Nevertheless, the "can do" attitude of the division's staff is well respected throughout the school system.

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[1] This study was originally a part of a comprehensive management review of all aspects of the Division of Supply and Property Management. Some of the warehouse observations and other data collection took place more than a year ago. Subsequently, for reasons which have no direct bearing on the findings in this report, the study was subdivided and certain findings in other parts of the study were reexamined. As a result, all of the reports have been delayed. In discussions of the draft version of this report, division managers indicated to study staff that during the intervening year improvements have been made in some of the areas, especially warehouse housekeeping practices and procedures, identified here as deficient.

CHAPTER 1

WAREHOUSING AND WAREHOUSE OPERATIONS

Findings

Functions of the Warehouse

The Lincoln Center Warehouse serves as the central location for most of the activities of the Division of Supply and Property Management. The primary use of the warehouse is the central receiving, storage, and distribution of school and office supplies. The building also houses the division's administrative offices, the textbook processing and depository function, the property control function, the furniture repair function, forms storage, and other types of general storage.

The five primary tasks performed in the warehouse related to the supplies function are (1) receiving, (2) stocking and inventory, (3) filling requisitions (picking), (4) packing orders for distribution, and (5) loading delivery vehicles. Exhibits 1 and 2 indicate the specific tasks performed in the work process flow for procuring, receiving, ordering, and distributing Warehouse Catalog items. The functions described are performed by staff in the Warehouse and Distribution Sections of the division.

Characteristics of Current Warehouse Facility

The existing warehouse building is located on the Lincoln Center site on North Stonestreet Avenue in Rockville. Although a location analysis was not conducted, the warehouse appears to be centrally located in relation to the schools and other facilities it serves.

Access of delivery vehicles to major roads, however, has been restricted in the last few years due to Metro construction. The increased traffic anticipated by the opening of the Rockville Metro station in the near future will further complicate this situation.

Although the warehouse is located along the B & O railroad track, there is no rail car unloading facility. Consequently, all deliveries are made by over-the-road trucks and vans, which further compounds the traffic and access problems. The service area currently being used for maneuvering tractor trailors and vans is unnecessarily restricted. This is best illustrated by the

Exhibit 1

Work Process Flow for Ordering and Distribution of Warehouse Catalog Items

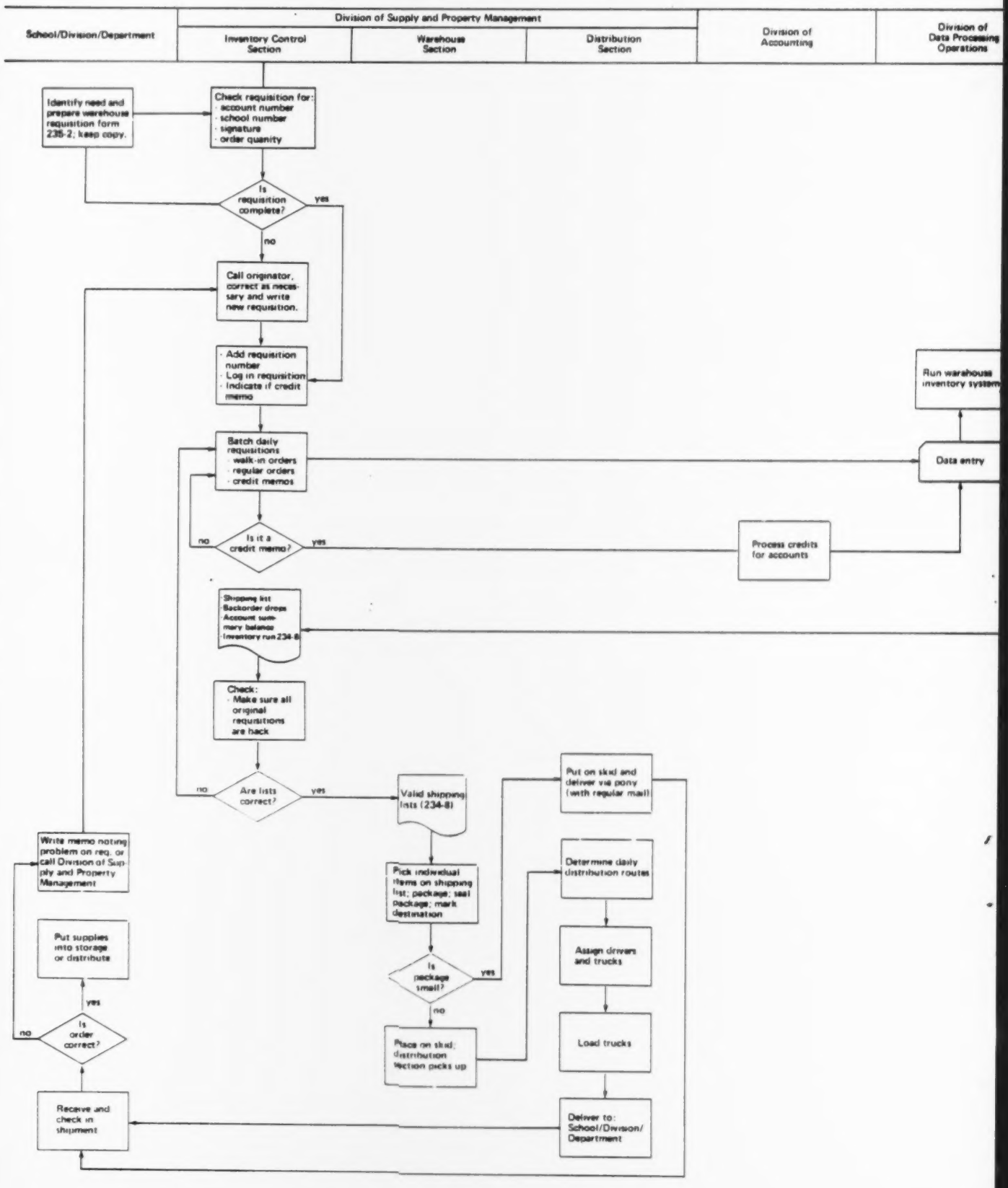
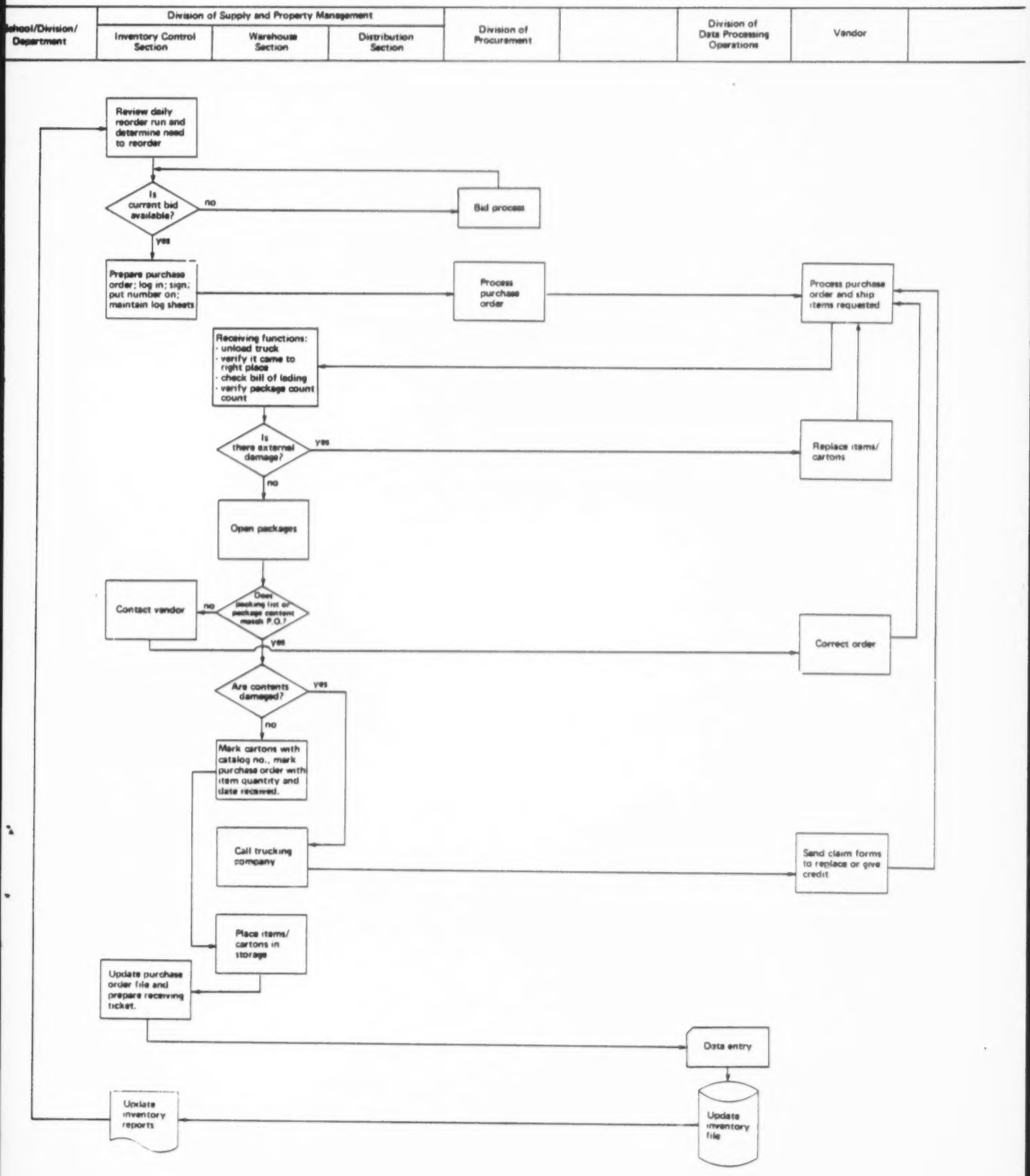


Exhibit 2

Work Process Flow for Purchase and Receipt of Supply Catalog Items



photograph in Exhibit 3. Not only is the current situation inconvenient for the drivers but also represents an unsafe situation. Large tractor trailers must back into the loading dock by making a sharp turn as illustrated in Exhibit 4.

The warehouse building is a one-story structure containing approximately 40,000 square feet of floor space. Actually, the warehouse consists of multiple adjacent buildings constructed at various times. The original warehouse comprised three surplus "quonset huts" obtained from the military. As requirements for additional warehouse space developed over the years, new adjacent buildings were added. The photograph in Exhibit 5 shows one of the three separate but connected buildings that currently comprise the warehouse. In the 1960's a new media processing center was constructed adjoining the warehouse. Although the Division of Supply and Property Management does not have responsibility for this function, the Processing Center is conveniently located for the division's distribution of library materials and films.

In general, the warehouse buildings are not well suited for the current use. Many structural conditions exist that make space utilization difficult, unsafe, and inefficient. Ceiling heights are low, and there is a lack of uniformity among the three buildings. In addition, light fixtures and air circulating fans hang from the ceilings at a height that interferes with the storage of supplies. This situation is shown in the photograph in Exhibit 6.

The series of buildings that comprise the warehouse are in generally poor physical condition. Roof leakage and other physical problems are evident. As can be seen in the photograph in Exhibit 7, construction of high rise commercial buildings adjoining the Lincoln Center site has significantly increased the value of this property in the last ten years. The completion of the Metro station only a few blocks away will further increase property value in this area. All of these factors indicate that MCPS should begin now to plan for a replacement warehouse and to assess the future of the entire Lincoln Center complex.

Warehouse Operations: Layout

The functional layout presented in Exhibit 8 shows the allocation of warehouse space to the various functions of the Division of Supply and Property Management. The three primary types of storage are (1) open area, (2) pallet racks, and (3) shelves. Exhibit 9 shows the actual floor space allocations by type of storage area. Since exact measurements are not required for comparison of space allocations, the block sectioning representation of space utilization has been used in this analysis. Data presented in Exhibit 9 show that over half (54 percent) of the available floor space in the warehouse is currently being used by the supply function. The next largest allocation of space is for the textbook processing function (14 percent).

The furniture repair function, which is assigned to the Division of Supply and Property Management, but which is not a "warehousing" function and would not usually be included in a warehouse (in part because of the flammable materials used for refinishing), occupies five percent of the floor area.

Exhibit 3

Exhibit 4

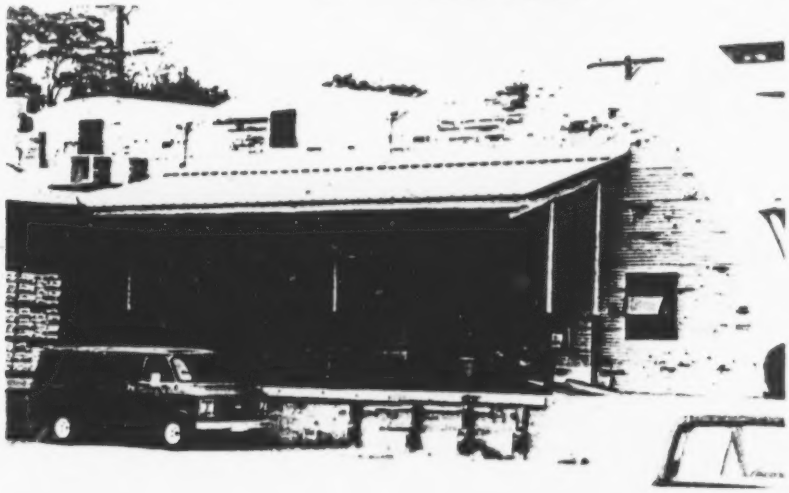
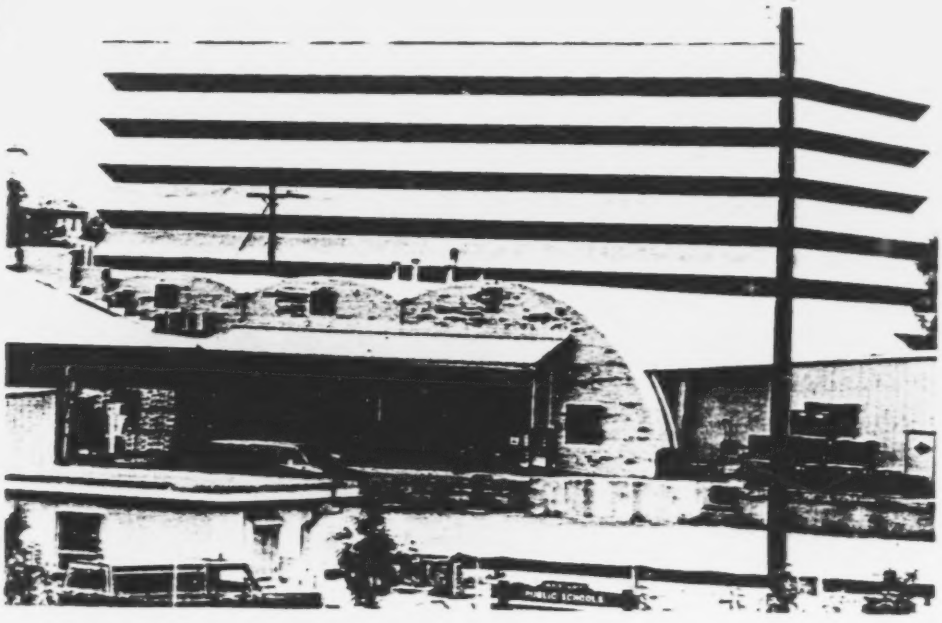


Exhibit 5

Exhibit 6

Exhibit 7



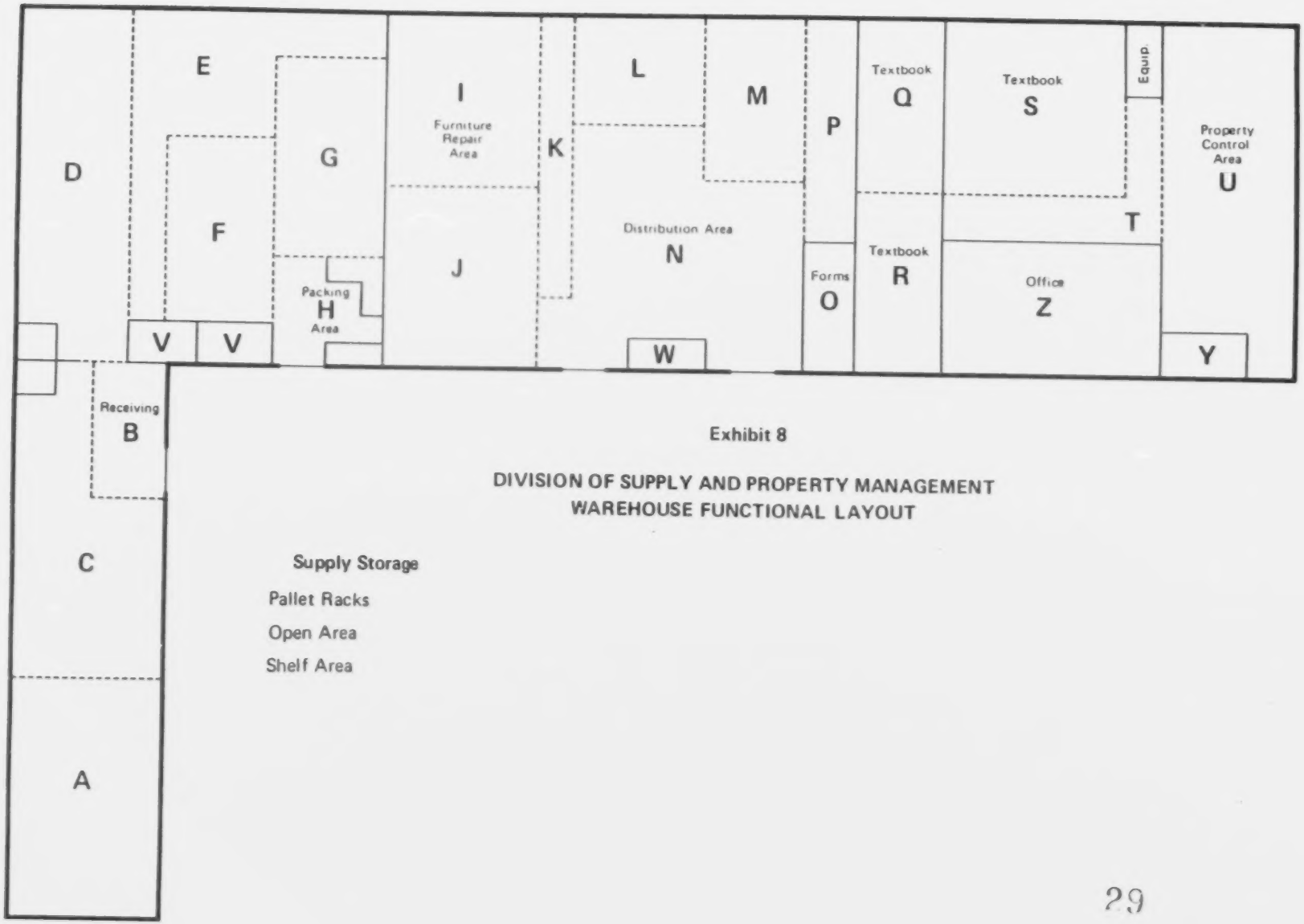


Exhibit 8

DIVISION OF SUPPLY AND PROPERTY MANAGEMENT
WAREHOUSE FUNCTIONAL LAYOUT

29

Exhibit 9

ALLOCATION OF WAREHOUSE FLOOR SPACE BY FUNCTION

Functions		Space	Percentage of Total
Supply Total		21,863	54
Supply Storage	15,757		
Receiving	760		
Packing	900		
Distribution	4,446		
Textbooks and ISM		5,704	14
Administrative		3,858	10
Furniture Repair		2,021	5
Property Control		3,168	8
Other storage		3,393	8
Forms storage		525	1

Periodic visits during the course of this study have provided evidence for the following observations concerning the layout of the warehouse:

1. The general flow of materials through the warehouse (receiving to storage to packing to loading) is good.

2. The amount of floor space allocated to the receiving function is insufficient. Temporary storage space and facilities to conduct the receiving inspection and stocking tasks are not available. When observed, the receiving area spaces were frequently crowded, messy, and unorganized.[1]

3. The amount of floor space allocated to the packing area is also insufficient. Workers sometimes did not have sufficient space to maneuver push carts and fork lifts or position supplies for the packing task.[1]

4. The area set aside for the furniture repair function was often cluttered with what appears to be a large backlog of furniture waiting for repair. The amount of space given to the furniture repair function is more than twice that provided to either the receiving or packing functions.

5. Floor space throughout the warehouse is neither identified nor marked. Visits to warehouses in surrounding school systems showed well-identified storage areas, with aisles and storage space markings painted on the floor.

[1]These situations are particularly severe during the six months peak period (May-October).

6. Aisles are too narrow and not straight. Some open storage areas did not have consistent aisles, but rather there were what appeared to be changing pathways around stacks of supplies. Narrow aisles make it more difficult for workers to perform effectively and may represent a safety hazzard to the proper operation of pallet rollers.

7. The receiving and shipping docks are located too close together. In addition, they are at right angles to each other rather than parallel. Consequently, tractor trailors attempting to position themselves at the receiving and shipping docks at the same time would have extreme difficulty.

8. In some sections of the warehouse, pallets loaded with supplies for storage were located in a single layer directly on the floor rather than on pallet racks which save floor space by layering pallets.

Warehouse Operations: Procedures

The study found that current procedures for ordering and inventory control are well established and usually followed. Although procedures for performing warehouse tasks seem to be known by employees, the study could not identify written standard operating procedures. Instead, the warehouse operations depend on institutional memory. While this arrangement may appear satisfactory to the current long-term employees, it provides no basis for instructing new employees, cross-training other employees, meeting emergency situations, or informing senior managers outside the division. Written procedures should normally be available for the following:

1. Processing confirming orders
2. Performing receiving functions
3. Picking and packing orders
4. Organizing the distribution area

The study also found that, although an item locator system is in place at each storage shelf location to direct staff to any additional location of reserve supplies of the same item, there is no written documentation for the system nor any master locator chart to direct personnel to the primary stock location. Again, the division relies on the institutional memory of long-time staff. Study observations revealed cases when warehouse staff spent unnecessary time locating supply items when filling orders. Well documented master item locator systems simplify the placement of new stock into inventory, promote rapid selection of stock for issue, facilitate training, and encourage maximum utilization of storage space.

The institutional memory of the long-term staff collectively in all of these procedural areas is a positive resource which could be tapped now to create the written documentation which will be needed in the future when turnover will inevitably occur.

Warehouse Operations: Housekeeping

During the course of the study project staff made numerous observation visits to the warehouse and found that during the peak May-to-October period some areas of the warehouse were consistenly messy, cluttered, and unorganized. Aisles in supply storage areas often contained boxes of materials either waiting to be placed into inventory or actually being stored there. An example of this situation is shown in the photograph in Exhibit 10. Open space and pallet rack storage areas were particularly cluttered and unorganized. The furniture repair area was found to be packed solid with furniture waiting for repair. Both the storage area and the work area for the furniture repair function were messy, extremely cluttered, unorganized, dark, unacceptable as a work environment, and a potential fire hazard. See the photograph marked as Exhibit 12.

In contrast to the above areas, the distribution and shelf storage areas were found to be generally neat and well organized with good housekeeping practices in evidence, as shown in Exhibits 11 and 13.

No evidence was found that housekeeping guidelines or standards are documented anywhere in writing.

Warehouse Operations: Material Handling Equipment

Three types of material handling equipment are used to move most of the supplies: (1) pallet rollers, (2) pallet lift rollers, and (3) grocery carts. A pallet roller is pictured in Exhibit 13 and is the primary piece of equipment used for loading and unloading tractor trailers and vans, moving palletized items into and out of storage areas, and moving packaged orders to the distribution area. Pallet rollers do not have the capability to raise pallets more than a few inches off the floor. To store or retrieve pallets from pallet racks four to eight feet above the floor, a pallet lift roller is used. This piece of equipment is similar in appearance and operation to the pallet roller except for its ability to raise the fork to greater heights. A single pallet lift roller is available in the warehouse.

Standard supermarket grocery carts are utilized to select (pick) small supply items and transport them to the packing area. The use of the grocery cart is pictured in Exhibit 11. The general finding of the study is that the material handling equipment currently being used is adequate.

Warehouse Operations: Safety

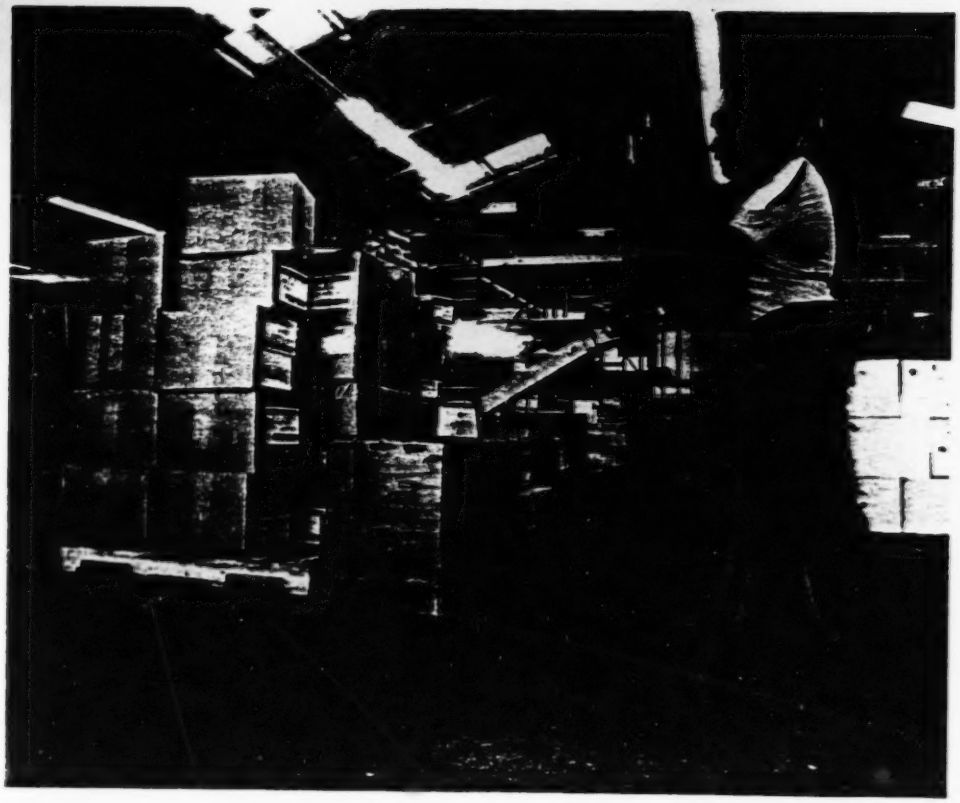
The design and physical condition of the warehouse, combined with the housekeeping practices discussed earlier, have contributed to the existence of a number of relatively unsafe working conditions. The photograph in Exhibit 10 shows cluttered aisles, poorly stacked boxes, and lights and fan equipment hanging in storage areas. Internal audit staff, who visit the warehouse periodically for other purposes, have observed similar situations. These conditions require employees to exercise skill and caution to avoid accidents.

Exhibit 10

Exhibit 11

Exhibit 12

Exhibit 13



During study visits to the warehouse, an additional unsafe practice was observed. Exhibits 14 and 15 show that flammable liquids were not stored in separate isolated and protected areas. In this case, duplicating fluid was observed in an open area next to paper storage. The warehouse facility has been inspected by Montgomery County fire inspection engineers and was passed at an acceptable level of safety. Nevertheless, improving on the storage practice reported here will increase the fire safety condition of the warehouse.

Almost a third of the respondents to the Staff Survey (28 percent) indicated that current conditions were "unsatisfactory." In addition, almost one-quarter of the staff (22 percent) indicated that the warehouse was an unsafe place to work. Seventy-two percent of the division staff, however, indicated that they thought that the environmental quality of the warehouse was either "very satisfactory" or "satisfactory"; and only a few accidents in the warehouse are reported annually.

Warehouse Operations: Security

Physical security within the warehouse appeared to be lax during normal operating hours. Except at night, security guards, gates, or electronic security systems are not used to monitor personnel movement into or within the warehouse. Current procedures for processing confirming orders allow school and other MCPS employees to be in the warehouse unaccompanied. During the summer months, doors are frequently left open for necessary ventilation purposes, thereby allowing uncontrolled access to the warehouse.

Warehouse managers do point out that "supervisors and staff are generally aware of strangers in the building. Whenever there is doubt, the stranger is politely addressed and offered assistance." Managers also point out that they know of no cases of significant loss or shrinkage from warehouse inventories. However, the external audit firm of Touche, Ross & Co. stated in the FY 1979 and FY 1980 management letters that, because of certain inventory accounting practices which provide for periodic adjustments based on historical trends, "information regarding the actual amount of shrinkage is not available." That is, with the exception of a significantly large amount or readily identifiable item, a recurring modest loss due to inventory shrinkage might go undetected because it would be built into the historical trend. In addition, good management practices suggest that internal controls, such as physical security, should be in place prior to any actual loss -- not instituted after it is too late. If a major security problem were to occur, MCPS would be asked to show that "reasonable care" had been exercised to safeguard the contents of the warehouse.

Many of the security factors identified here for the supply warehouse are also true for other parts of the Lincoln Center complex. Valuable collections of library materials, audio-visual equipment and films, computers, printing equipment, and other items are located at Lincoln Center. Addressing the security issues may, therefore, require solutions which go beyond the Division of Supply and Property Management alone.

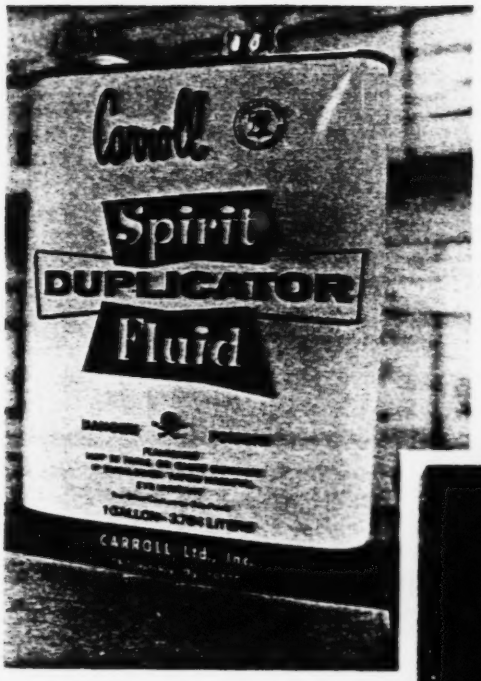


Exhibit 14

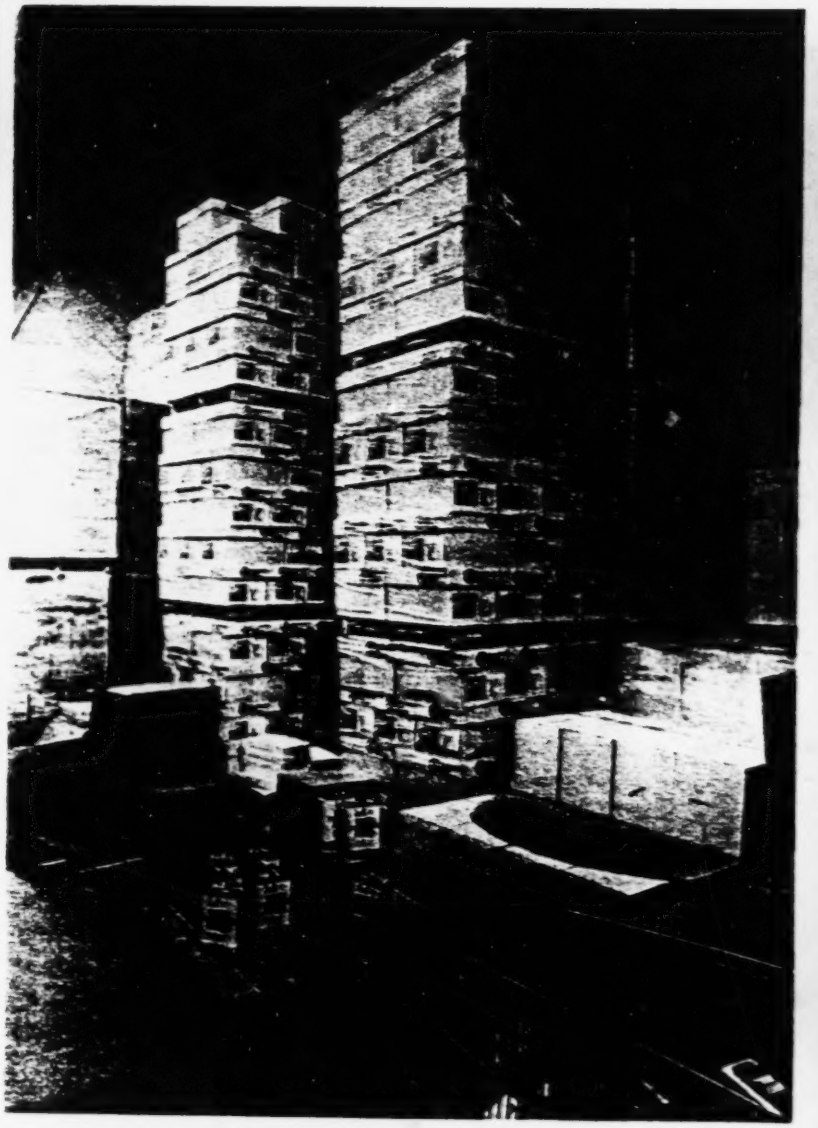


Exhibit 15

Implications of the Findings

Current Warehousing Practices

Although the warehouse is not in good physical condition and imposes certain physical constraints on operations, it appears likely that the current facility will continue in operation for at least several more years. (See the next section regarding study of a possible new facility.) During the continuing use, the overall efficiency and effectiveness of the supply warehouse operations could be improved by:

1. Reexamining the overall layout of the warehouse with the minimum objective of considering changes in the layout to improve the space allocated to receiving and packing, widen and mark the aisles, and sparate further the receiving and shipping areas

2. Developing written operating procedures and a stock locator system

3. Continuing to improve and documenting current housekeeping practices

4. Enforcing safety requirements for personnel and stored materials

5. Improving security for the warehouse specifically and for Lincoln Center generally (One improvement might be to install metal gates, which permit ventilation but restrict personal passage, on selected external warehouse doors.)

These changes/improvements could be accomplished with a minimum of expense. At the same time, an offsetting modest savings should result from the greater efficencies of better procedures and housekeeping.

Future Warehouse Requirements and Improvements

The current warehouse is old, in poor physical condition, and not well suited for continuing use as a warehouse. If MCPS continues operating a centralized warehouse, consideration will have to be given to a replacement facility.

The value of the property on which the warehouse and the rest of the Lincoln Center complex is currently located is increasing significantly with the changing surroundings. Although state law would require MCPS to surrender this property to the county government if it were no longer required for school system use and the county would benefit directly from the increased value, MCPS could benefit indirectly through an agreement with the county regarding the financing of a replacement warehouse.

MCPS currently operates a number of independent warehouse facilities and inventory control systems, including the Food Service Warehouse, the Division of Maintenance Warehouse which is operated by the Division of Supply and Property Management, and the primary transportation parts warehouse. Although separate, these warehouses are all part of the Shady Grove Government Services Park in Gaithersburg.

The existence of these separate warehouses and the deteriorating condition of the supply warehouse raise the question of consolidating warehouses to introduce economies. Sanitation requirements, Federal Drug Administration regulations, and other factors restrict the opportunities for consolidation of the supply warehouse with the food services warehouse, although there may be ways to protect the food services operations while taking advantage of the rail siding, energy conservation opportunities, and other operating economies. The hygienic factors would not be involved if the consolidation were with transportation or maintenance warehouse and inventory operations.

On the other hand, it may be that a well-designed, self-contained warehouse and distribution center for the Division of Supply and Property Management would prove to be more cost-effective.

The determination of (1) the cost-effectivness and advisability of operating some type of consolidated warehouse; (2) which current warehouse operations, if any, should be consolidated; (3) how the construction and operating costs of a consolidated warehouse would compare to a separate new warehouse for the Division of Supply and Property Management; and (4) whether other units from the Lincoln Center complex should be included in any relocation is not within the scope of this study. However, at the appropriate time, the possible advantages of consolidating staff, sharing floor space, and utilizing common inventory control systems should be explored. With this in mind, MCPS should consider a warehouse relocation and consolidation study to determine the feasibility of various alternatives for replacing the warehouse and other Lincoln Center facilities. This study should be undertaken when either (1) alternative purchasing/distribution systems are considered or (2) it becomes physically necessary to replace the existing supply warehouse. Any new or consolidated warehouse facility which results from the study should be fully automated with a modern inventory control system.

Recommendations

The findings and implications reported in this chapter lead to the following recommendations:

1. The tractor-trailer service area in front of the receiving and shipping docks should be modified to provide additional room to maneuver vehicles. This can be accomplished by moving employee parking closer to North Stonestreet Avenue.

2. A new layout of the floor space allocations should be developed and include the individual suggestions contained in this report. Among these suggestions are (a) increasing the space allocation for the receiving and packing functions, (b) converting some open storage area to pallet rack storage area, (c) increasing the width of and marking the floor for aisles, and (d) further separating the receiving and shipping areas.

3. A more formal, expanded, and documented stock locator system should be designed and implemented.

4. A program to continue increasing the awareness and importance of good housekeeping practices should be developed.

5. Existing standard operating procedures should be documented and issued in writing for confirming orders, receiving functions, picking and packing, and distributing.

6. All types of flammable liquids and other similar materials should be stored in a separate controlled area.

7. The inclusion of the furniture repair area within the warehouse building should be reassessed for safety reasons.

8. A comprehensive security plan which stresses the concept of "reasonable care" should be developed for the warehouse in close consultation with other MCPS units located at the Lincoln Center. The plan should include procedures which limit access to and movement within the warehouse by any persons other than personnel of the Division of Supply and Property Management. One aspect of these procedures should be the establishment of a "secure" area for picking up confirmed orders. Another aspect is securing exterior doors and/or installing gates.

9. Because of the physical condition of the existing warehouse, the lack of a railroad siding, the increased value of the Lincoln Center site, and the increased traffic congestion, consideration should be given to another site for the supply warehouse and possibly for the other functions currently located at Lincoln Center. Part of that consideration should include a feasibility study and cost-benefit analysis of consolidating the MCPS supply warehouse with other MCPS warehouse operations at the Shady Grove site.

CHAPTER 2

DISTRIBUTION OF SUPPLIES AND MATERIALS

Findings

A number of MCPS divisions conduct distribution activities with separate fleets of vehicles. The two major fleets directly concerned with distribution of supplies and materials are the Division of Supply and Property Management and the Division of Food Services. In addition, the Division of Maintenance has a fleet of vehicles which periodically makes trips and distributes supplies and materials to schools and other MCPS facilities. The Division of Transportation, in providing pupil transportation services, makes scheduled daily visits to all schools; however, these visits are not considered in this chapter because their purpose is so distinct from the distribution of supplies and materials. But the Division of Transportation does move parts and supplies among the four bus depots, and that movement is included here.

Each of the supplies and materials distribution fleets is described for the purpose of indicating the level of distribution activity. Discussion and recommendations are then focused on (a) the distribution fleets operated by the Division of Supply and Property Management, (b) potential consolidations of the separate delivery fleets throughout MCPS, and (c) one future operating improvement for a food services fleet. Other management studies have or will evaluate various additional aspects of the other fleet operations.

The Division of Supply and Property Management

The Distribution Section of the Division of Supply and Property Management has responsibility for:

1. Delivering warehouse supplies to schools, MCPS offices, and other Montgomery County Government locations
2. Moving equipment and supplies between schools and offices
3. Transfering furniture and equipment from closed schools to other schools or to the warehouse
4. Providing the Pony, MCPS's internal mail system
5. Hauling fuel oil from vendor terminals to schools, offices, and other Montgomery County Government locations

The distribution of fuel oil, including the associated personnel and vechicle resources, will be discussed in a separate report. The primary purpose of this and the following sections is to review the distribution of mail and supplies by the Division of Supply and Property Management.

Excluding fuel oil deliveries, the Distribution Section operates five cargo vans, seven step vans, and one trailer. The supervising supply services worker has primary responsibility for carrying out the functions of the section. He is supported by 11 supply services worker II's (grade 10), who drive cargo and step vans; three supply services worker I's (Grade 8), who serve as delivery helpers; and three tractor-trailer operators (Grade 11), who may drive either fuel oil or supply trailers.

A dispatcher position and two tractor-trailer operator positions have been eliminated from this section since FY 1982. The dispatcher's responsibilities were combined with the supervisor's duties. Although the number of schools has declined significantly over the last 8 to 10 years due to school closings, only one supply services worker position has been deleted since FY 1976.

Delivery of Warehouse Supplies

The supply distribution process begins at the distribution area of the warehouse were palletized supply orders, packaged by school, are loaded onto the vans. Vans are usually loaded at the end of the day so they are ready for early delivery the following morning. Drivers and their helpers are responsible for loading vans.

The county is divided into five predetermined delivery areas, one per delivery van. Each school in each area may receive a daily supply delivery. The distribution supervisor daily monitors the shipping lists ready for delivery, assigns the delivery helpers where they are most needed, and manually modifies the predetermined routes as necessary to eliminate schools with no orders. However, the modifications are minimal. Although not all delivery stops need to be made every day (because there are no supply or textbook orders for specific schools), the stops which are necessary and usually made in the same sequence listed in the route for each area. School delivery assignments which cross the five area boundaries are rarely, if ever, made. These procedures do not necessarily ensure that the most cost effective use is made of equipment or personnel resources nor that the fewest miles are driven.

Theoretically, these procedures can result in deliveries to each school every day. Exhibit 16 shows the results of asking school principals to what extent they thought the frequency of supply deliveries could be reduced. Approximately half of the principals responding (51 percent) indicated that the frequency of deliveries could not be reduced without having a negative impact on the instructional program in their school. High school principals responded more favorably to reduced supplies deliveries than did elementary and junior high principals. Although half of the principals surveyed (49 percent) felt that the frequency of deliveries could be reduced to several times a week, no one felt that the reduction could be extended to less than once a week. It is interesting to note that three of the four school systems visited (with central warehouses) currently make other than daily deliveries to schools.

Exhibit 16

EXTENT TO WHICH THE FREQUENCY OF SUPPLY DELIVERIES CAN BE REDUCED BY SCHOOL TYPE*

Frequency	All	Elem.	Junior	Senior
Three times/week	14%	14%	14%	17%
Twice per week	8	11	0	0
Once per week	18	17	29	17
Twice per month	0	0	0	0
Once per month	0	0	0	0
Cannot be reduced	51	53	57	33
Other	8	6	0	3

* Percentage response by answer choice to the question "To what extent could the frequency of these deliveries (daily supply deliveries) be reduced without having a negative impact on the instructional program in this school?"

No written dispatch records are maintained by the division. Therefore, it is not possible to determine accurately the frequency with which deliveries are made to individual schools nor the size and quantity of packages delivered when stops are made.

Use of Helpers on Delivery Vans

The delivery helpers are usually assigned to three of the five delivery vans on a daily "most-needed" basis by the supervisor. The primary functions performed by the helpers are to assist the driver in loading the van at the warehouse and unloading supplies at each school. Upon arrival at the school, the driver usually tries to locate someone to sign for the delivery while the helper begins to unload supplies. When the driver returns, they continue to unload supplies and deliver them to the appropriate location in the building. There are no paperwork or other tasks to be performed between stops.

Study observations of the delivery process in schools revealed that (1) most schools, especially at the secondary level, have building services staff who could be available to help unload supplies; (2) school staff contacted by the driver may be the building service manager, a building service worker, secretary, or clerk; and (3) the person signing for receipt of supplies usually only verifies the number of boxes delivered, with further checking of boxed items done at a later time.

The rationale identified by supply management personnel for the helper is that (1) some supplies/equipment delivered to schools require two people because of size and/or weight factors, (2) the volume of supplies unloaded at many

locations is such that considerable time is saved by having the helper assist in the unloading task, and (3) two people per delivery van reduces the probability of loss by theft. The study found that none of the other school systems visited by project staff uses helpers on delivery vans.

The Pony Delivery

In FY 1984, responsibility for the Mailroom was transfered from the office manager in the Educational Services Center to the Division of Supply and Property Management, which already had responsibility for the Pony deliveries.

Five drivers and trucks are used to deliver mail, small supply packages, and films to schools and offices. Each van follows a pre-established route and makes daily stops for delivery and pickup at each school or other location. The Pony service originates from the Mailroom in the Educational Services Center, and pickups of small supplies are made at the warehouse. Films are picked up at the film library adjacent to the warehouse, transported to the Mailroom in the ESC, sorted by school, and distributed to schools via the Pony vans.

Exhibit 17 shows the results of asking school principals to what extent they felt that Pony deliveries could be reduced without having a negative impact on the instructional programs in their schools. Principals surveyed were stronger in their response to this question than to the question concerning reducing the frequency of supply deliveries. Eighty-one percent responded that the frequency of Pony deliveries could not be reduced without an impact on their schools. All (100 percent) of the responding junior high principals indicated that the frequency of Pony deliveries could not be reduced below the current daily schedule. Senior high principals were the most willing (33 percent) to reduce the frequency of Pony deliveries.

Exhibit 17

EXTENT TO WHICH FREQUENCY OF PONY DELIVERIES CAN BE REDUCED BY SCHOOL TYPE*

Frequency	All	Elem.	Junior	Senior
Three times/week	12%	11%	0%	33%
Twice per week	0	0	0	0
Once per week	0	0	0	0
Cannot be reduced	82	81	100	67
Other	6	8	0	0

* Percentage response by answer choice to the question "To what extent can the frequency of these deliveries (daily pony deliveries) be reduced without having a negative impact on the instructional program in your school?"

Distribution of Food Services Supplies

Since the completion of the Food Services Warehouse, the distribution of all food supplies has been the sole responsibility of the Division of Food Services. Two separate types of food supply systems are currently operated by the division. One involves the weekly distribution of food and related supplies from the Food Services Warehouse to schools with on-site kitchens. The second distribution system involves the daily delivery of satellite lunches from the five central kitchens to satellite schools.

Schools with on-site kitchens submit weekly orders for food and other supplies. The Food Services Warehouse supervisor has overall responsibility for coordination of the distribution of supplies. Three delivery vans are used for this purpose and make one scheduled weekly delivery to each school. Drivers load their vans at the warehouse using pallets and unload at the schools using hand trucks. No helpers are employed on the vans and generally no one at the schools helps with the unloading. The Food Services Warehouse supervisor daily modifies the delivery routes according to total loads and quantities to be unloaded at individual schools.

In the 1983-1984 school year, the Division of Food Services operated 5 central kitchens, serving a total of 67 satellite schools. Exhibit 18 shows the number of routes and number of satellite schools served by each central kitchen.

Twenty-one trucks are available to cover the 17 routes (this figure includes 4 spare trucks). Ten of the trucks are regular step vans and seven are refrigerated step vans. The regular vans are given the shortest routes. The sequence of satellite school stops is fixed, and vans make the same runs every day. Because of the nature of satellite lunches, a small time window exists in which the lunches must be delivered. Consequently, drivers are employed for 4 to 6 hours per day which includes time to pick up their assigned vans at either the Shady Grove or Randolph Road Transportation Centers. No helpers are assigned to these vans. Drivers load and unload vans and, as time permits, work on the assembly line in the central kitchen. They complete their routes and return to the transportation centers between 12:30 -1:30 p.m. each day for refueling, security, and overnight maintenance of their trucks, as necessary.

Exhibit 18

FREQUENCY OF ROUTES AND SATELLITE SCHOOLS
BY CENTRAL KITCHEN FOR FY 1985

Central Kitchen	Satellites Served	No. of Routes
King	12	3
Fallsmead	15	4
Sherwood	17	4
Takoma Park	11	3
Bethesda Chevy Chase	11	3
Total	67	17

Maintenance

The Division of Maintenance uses a fleet of approximately 260 trucks to transport both workers and materials to schools and other MCPS facilities where the maintenance functions are performed. Vehicles are operated out of the Shady Grove Maintenance Center where the Maintenance Warehouse and offices are located and from three other decentralized depots which the division shares with the Division of Transportation. Staff at each depot provide maintenance services to a set number of schools in a given geographical area and make trips to these schools on both scheduled and emergency bases. When not in use, all maintenance vehicles are parked at the depots.

Pupil Transportation

The Division of Pupil Transportation operates and services its fleet of buses from the same four decentralized depots which are used by the Division of Maintenance. The vehicle maintenance program at these depots requires that parts and supplies be delivered from the primary transportation parts location at Shady Grove to the other three depots and occasionally among the other depots.

Implications of the Findings

Delivery of Warehouse Supplies

Because no written dispatch records are maintained, it was not possible for project staff to determine the frequency of deliveries to individual schools or types of schools, although it is generally agreed that not all schools receive deliveries every day. Nearly half of the principals surveyed indicate that something less than daily supply deliveries would be acceptable without damage to the instructional program. Almost 20 percent of the principals are willing to have deliveries be as infrequent as once a week.

Currently five vans are making supply deliveries each day for a weekly total of 25 runs. If supply deliveries were reduced from five to three days a week (the minimum reduction supported by the largest number of principals) and a staggered delivery schedule begun, only 15 runs would be required each week. At least one delivery van (possibly two, depending upon other distribution needs of the division) could be deleted at this reduced level of service.

Since three deliveries a week would result in supplies reaching the schools within one day of when they do now and since schools could continue the existing practice of sending someone to the warehouse to pick up emergency orders, it appears unlikely that this level of reduced delivery services would have any significant impact on school operations.

As shown on Exhibit 19, if the salaries of one driver and one helper are deleted along with the elimination of one delivery van, a reduction to the level of supply delivery service suggested in this report would result in an annual savings of approximately $50,000.

Exhibit 19

ESTIMATED ANNUAL SAVINGS FROM REDUCING SUPPLY DELIVERIES TO THREE TIMES PER WEEK

Item	Savings
Supply Services Worker II, Grade 10, Step D	$17,160
Supply Services Worker I, Grade 8, Step D	15,787
Fringe Benefits at 30%	9,884
Operating Costs and Depreciation Associated with Supply Delivery Function for Van	7,538
Total	$50,369

Use of Helpers on Delivery Vans

The reduction in the number of supply deliveries and the corresponding reduction of at least one delivery van assumes a reduction in the number of delivery helpers by one.

Beyond this reduction is a further possible reduction by eliminating helpers on all delivery vans. On the one hand, the study observed that (a) none of the surrounding school systems which use the centralized warehouse concept find it necessary to provide helpers on supply delivery vans, (b) the MCPS Division of Food Services does not provide helpers on its supply vans although some roughly equivalent weights and delivery situations are involved, (c) building service workers are frequently available to assist with unloading at the schools, and (d) most of the items delivered do not require two persons to carry them.

On the other hand, it was noted earlier that supply division managers point out (a) the size or weight of some delivered items require a second person to unload, (b) the quantity of items delivered at some locations is such that a helper saves time, and (c) the presence of two persons is a theft deterent. Although other internal control mechanisms, such as signed manifests and delivery slips, can serve as well as a second person to deter theft, the other two points have validity. However, they are not true for every delivery at every school. By grouping large quantity or heavy items on one of the three weekly deliveries to each school and by adjusting routes to balance total daily loads, the need for supply helpers could be reduced to a single position which would be rotated daily among the five delivery areas.

A reduction of another supply service worker I would save an additional $20,500, including fringe benefits, annually.

During the summer months when school closings and other special factors can increase the volume of large or heavy items being transported on the cargo

vans, the current practice of using temporary helpers paid from part-time funds might need to be expanded slightly to offset the position loss. Approximately $5,000 provides 12 weeks of temporary summer help.

Delivery Van Routing

Although division managers indicate that the delivery van routes "are modified on a daily basis to adjust for loading and delivery quantities," the extent of the modifications could not be determined because of the absence of written dispatch records. Information obtained from study interviews is inconsistent on this point. However, since managers indicate that vans are not rerouted across the boundaries of the five predetermined delivery areas, it is clear that at least that self-imposed constraint exists to limit optimal route modifications.

Whether or not the supply delivery service is reduced, obtaining fuel economies and reducing driving times require that maximum effort be given to daily route modifications. If the study suggestions to reduce deliveries and delivery helpers are implemented, careful monitoring and modification of loads and routes become critical.

The Pony Delivery

The study identifed no need for, potential for savings from, or desireability of making changes in the current Pony delivery system at this time. If other recommendations of this report to relocate the warehouse or consolidate delivery fleets were implemented, a reexamination of the Pony delivery system might be required.

Multiple MCPS Delivery Systems

The study found that, even without including the pupil transportation bus fleet, MCPS is currently operating at least 7 different delivery systems. These are the following:

- Warehouse supplies and equipment
- The Pony
- Fuel oil
- Food services satellite meals
- Food services supplies and unprocessed foods
- Maintenance supplies, equipment, and personnel
- Transportation parts and supplies among depots

Although some economies have been identified in this and other management studies for several of these individual delivery systems, a greater savings would occur if consolidation of deliveries were possible with the subsequent reduction or elimination of one or more existing fleets.

Full feasibility and cost analyses are not within the scope of this study. However, the following three possible fleet consolidation situations should at least be examined:

1. Pony and Warehouse Supply Deliveries

   Current practice calls for small supply packages to be included on the Pony delivery. Since study observations showed that many warehouse supply packages can be handled by one person, a greater number of supply packages could be added to the Pony runs except for two constraints: (a) the limited interior space and layout of the Pony step vans and (b) the Pony delivery procedures which do not require the driver to contact school personnel or obtain receipt signatures. Therefore, the feasibility and availability of using some larger Pony delivery vehicles or modifying the interior configuration of the existing step vans should be explored, and the added delivery time within schools should be estimated. Then the operating costs and delivery personnel time of an expanded Pony delivery system could be compared to the personnel and operational savings from reducing the supply delivery fleet.

2. Food Services and Warehouse Supply Deliveries

   Food services cargo vans currently make weekly deliveries to all schools from the Food Services Warehouse at Shady Grove, while similar supply management cargo vans make daily (recommended in this report to be reduced to three times each week) deliveries to all schools from the Lincoln Center Warehouse. Hygienic restrictions and the separation of the two warehouse locations have served as constraints against considering any consolidation of these two delivery fleets. Nevertheless, the possibility that operating savings, especially on the longer runs to more distant schools, might result makes the idea of consolidation, at least for non-food items, appealing. If both warehouse supplies and food supplies were issued from the same or adjacent facilities (a possible outcome of the warehouse relocation/consolidation study recommended in Chapter 1), the opportunities for fleet consolidation would increase. Further, if the Pony vans were to carry a greater number of supply packages, as suggested above, consolidation with food services for only the remaining larger/heavier supply items would appear still more feasible and might make possible the virtual elimination of a separate supply delivery fleet.

3. Maintenance and Transportion Depot Deliveries

   Transportation and maintenance managers should adopt procedures which assure that neither division would separately move parts and supplies from one depot to another without determining whether the other division had a similar need at roughly the same time.

Food Services Satellite Delivery Vans

Currently, the food services satellite delivery vans are returned to the transportation depots from the central kitchen locations for refueling, security, and overnight maintenance, as necessary. While this is a convenience in the case of refueling and maintenance, other arrangements could be worked out if that would permit an operational savings by eliminating "deadhead" mileage from kitchen to depot and back. However, food services managers point out that there is no current alternate arrangement for truck security since there are no fenced lots at the kitchen locations.

The Division of Transportation has been exploring the feasibility of establishing satellite parking depots for school buses. Each satellite parking lot would be secure and equipped with fuel pumps. If one or more of these satellite lots were located adjacent to a central kitchen, both the Divisions of Transportation and Food Services would benefit. This consideration should be introduced into transportation's feasibility study.

Recommendations

The findings and implications reported in this chapter lead to the following recommendations:

1. The frequency of warehouse supply deliveries to schools and other locations should be reduced. The initial reduction should be from daily to three times a week, with a corresponding reduction in vans, drivers, and helpers. After a year's experience with such a schedule, some further adjustment in frequency may be appropriate.

2. The current practice of assigning delivery helpers (supply services worker I) to supply delivery vans should be changed to provide a helper only on a minimum of one delivery run to each location once a week.

3. The existing practice of using part-time funds during the peak summer months should be expanded as necessary to compensate for the reduction in the number of delivery helper positions.

4. Supply delivery loading and routes should be modified on a daily basis to compensate for scheduled schools which require no delivery that day, to concentrate large items which require a delivery helper, and to adjust for total loading and delivery quantities between cargo vans. Predetermined delivery areas and routes should not be viewed as absolute constraints to the modification procedures.

5. Written dispatch records and manifests should be maintained.

6. MCPS should conduct a study to determine the feasibility and cost-effectiveness of consolidating some or all of the warehouse supply deliveries with the Pony deliveries and/or the food services

deliveries in order to reduce or eliminate one or more of the separate delivery fleets. This study should be closely coordinated with the warehouse relocation/consolidation study recommended in Chapter 1.

7. Managers of the transportation and maintenance divisions should establish the necessary procedures to assure that duplicate delivery runs for parts and supplies are not made between the depots.

8. The Division of Transportation's feasibility study of satellite bus parking lots should be expanded to consider the savings to food services delivery operations if one or more of these satellite lots were located near a central kitchen.